



## INDIANA DEPARTMENT OF TRANSPORTATION

### STANDARDS COMMITTEE MEETING

*Driving Indiana's Economic Growth*

# APPROVED MI NUTES

## October 16, 2008 Standards Committee Meeting

### MEMORANDUM

November 21, 2008

TO: Standards Committee

FROM: Mike Milligan, Secretary

RE: Minutes for the October 16, 2008 Standards Committee Meeting

The Standards Committee meeting was called to order by the Acting Chairman at 9:01 a.m. on October 16, 2008 in the N755 Bay Window Conference Room. The meeting was adjourned at 10:49 a.m.

The following members were in attendance:

Ron Heustis, Acting Chairman  
Dennis Kuchler, Constr. Mgmt.  
Ron Walker, Materials Mgmt.  
Carl Tuttle\*, Highway Ops.  
Tom Caplinger, Crawfordsville Dist.

Dave Andrews, Pvmt. Engineering  
Bob Cales, Contract Admin.  
John Wright, Roadway Services  
Anne Rearick, Structural Services  
Jim Keefer, Fort Wayne Dist.

\* Proxy for Mike Bowman

Also in attendance were the following:

Mike Milligan, Secretary  
Jim Reilmam, INDOT  
Tony Uremovich, INDOT  
Steve Fisher, INDOT  
Peter Allaben, INDOT

Gannon Carnes, INDOT GEDP  
Paul Berebitsky, ICA  
Robert Dirks, FHWA  
Brad Cruea APAI

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

1. **ACTION:** Mr. Heustis handed out the following for the Committee's information:  
Draft Recurring Special Provision 109-C-219 PG Asphalt Binder Material Cost Adjustments  
Business Rules for Asphalt Binder Index Maintenance  
Example Cost Adjustment Calculation Spreadsheet

Mr. Heustis noted that the RSP allowed the bidder to choose to opt in or opt out of application of Material Cost Adjustments on a specific project through Bid Express as part of the bid process.

The PE/PS must calculate adjustments by Job Mix Formula.

If any one HMA pay item exceeds 2,000 tons on a project, either plan quantity or revised quantity, all HMA pay items will be adjusted. If a quantity is revised to exceed 2,000 tons at some time during the project, adjustments will be made from that time forward. There will be no adjustments applied to the project quantities before the time of the revision.

NEW BUSINESS

1. Approval of September 18, 2008 Minutes

**ACTION:** The Final Draft Minutes approved as submitted.

Motion: Andrews  
Second: Cales  
Ayes: 9  
Nays: 0

2. **ACTION:** Mr. Heustis mentioned that the November 20 meeting conflicted with a JTRP Board meeting which Mark Miller, Ron Walker and Mike Bowman were scheduled to attend. After discussion of possible rescheduling options, the Committee decided that the November 20 Standards Committee meeting would be held at its scheduled time.

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

*(No items on this agenda)*

NEW BUSINESS

*(No items on this agenda)*

C. RECURRING SPECIAL PROVISIONS PROPOSED ITEMS

Item 08-14-1	Mr. Andrews	5
411-R-432	Warranted Micro-Surfacing	
Action:	Passed as submitted	

D. STANDARD SPECIFICATIONS AND STANDARD DRAWINGS PROPOSED ITEMS

OLD BUSINESS

Item 08-12-6	Mr. Heustis	13
707	PRECAST AND PRECAST PRESTRESSED	
	CONCRETE STRUCTURAL MEMBERS	
Action:	Withdrawn	
Item 08-12-7	Mr. Heustis	25
910.01(a)	General	
910.01(b)2	Threaded Tie Bar Assembly	
910.01(b)7	Uncoated 7 Wire Strand for Prestressed	
	Concrete	
910.01(b)9	Epoxy Coated Reinforcing Bars	
Action:	Passed as revised	

NEW BUSINESS

Item 08-14-2	Mr. Kuchler	29
711.65(c)	Bolted Parts	
Action:	Passed as revised	
Item 08-14-3	Mr. Heustis	31
801.03	General Requirements	
Action:	Withdrawn	
Item 08-14-4	Mr. Kuchler	32
909.02(a)1	Multi-Component Inorganic Zinc	
	Silicate Primer	
909.02(a)2	Organic Zinc Primer	
Action:	Passed as revised	

cc: Committee Members (11)  
FHWA (2)

SPECIFICATION REVISIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Revision was passed at July 17, 2008 Standards Committee meeting. Needed corrections were discovered afterwards. Specifically, 411.05 reference to raised pavement markers should be deleted. Reference to "segments" in 411.11 (fourth paragraph) should be deleted.

PROPOSED SOLUTION: Revise specification to reflect these corrections.

APPLICABLE STANDARD SPECIFICATIONS:

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: 52-11.0

APPLICABLE SECTION OF GIFE: Unknown

APPLICABLE RECURRING SPECIAL PROVISIONS: 411-R-432

Submitted By: Dave Andrews

Title: Manager, Office of Pavement Engineering

Organization: INDOT

Phone Number: 317-232-5452

Date: September 18, 2008

APPLICABLE SUB-COMMITTEE ENDORSEMENT:

## REVISION TO RECURRING SPECIAL PROVISION

## 411-R-432 WARRANTED MICRO-SURFACING

01-01-09

## 411-R-432 WARRANTED MICRO-SURFACING

(Revised 07-17-08)

The Standard Specifications are revised as follows:

SECTION 411, BEGIN LINE 1, INSERT AS FOLLOWS:

**SECTION 411 – WARRANTED MICRO-SURFACING****411.01 Description**

*This work shall consist of furnishing materials and the construction of warranted micro-surfacing in accordance with 105.03. Multiple course micro-surfacing shall consist of a surface course over a rut fill or leveling course. Single course micro-surfacing shall consist of a surface course.*

*The Contractor shall be responsible for the warranted micro-surfacing for a period of three years after the date all warranted micro-surfacing is completed and open to unrestricted traffic.*

**MATERIALS****411.02 Materials**

*Materials shall be in accordance with the following:*

<i>Asphalt Emulsion .....</i>	<i>As Defined*</i>
<i>Coarse Aggregates – Class B or Higher ** .....</i>	<i>904</i>
<i>Fine Aggregates*** .....</i>	<i>904</i>
<i>Portland Cement, Type I .....</i>	<i>901.01(b)</i>
<i>Water .....</i>	<i>913.01</i>

\* Polymer Modified Asphalt Emulsion shall be a quick-set, CSS-1h emulsion in accordance with AASHTO M 208 except the cement-mixing test is waived. The polymer material shall be milled or blended into the asphalt or blended into the emulsifier solution prior to the emulsification process. The minimum polymer solids content will be 3.0% based on the residual of the emulsion. Mix set additives shall be added as required to provide control of the quick-set properties. Additional requirements shall be in accordance with the following.

Characteristics	Test Method	Requirement
Residue (Note 1)	AASHTO T 59	62+
Softening Point, °F (°C)	AASHTO T 53	140+ (60+)
Viscosity @ 140°F (60°C)	AASHTO T 202	8000+
Elastic Recovery @ 77°F (25°C)	AASHTO T 301	60
NOTE 1. The temperature for this test shall be held below 180°F (82°C). The sample is oven evaporated on a glass plate at 77°F (25°C) for 24 h (forced draft oven). Material is then scraped from the plate with a razor blade tool.		

\*\* The coarse aggregate angularity shall be a minimum of 95% in accordance with ASTM D 5821. The coarse aggregate for rut fill shall be limestone, dolomite, crushed gravel, sandstone, ACBF, or SF. The surface application aggregate type shall be based on the ESAL category in the Surface Aggregate Table below.

\*\*\* The fine aggregate for micro-surface shall be limestone, dolomite, crushed gravel, sandstone, ACBF, or SF. The fine aggregate angularity shall be a minimum of 45 in accordance with AASHTO T 304 Method A. The clay content of the blended aggregate material from the fine and coarse aggregates shall meet a minimum sand equivalency of 65 in accordance with AASHTO T 176. The surface leveling application aggregate type shall be based on the ESAL category as follows:

Surface Aggregate Table			
Coarse or Fine Aggregate Type	Traffic ESALs		
	< 3,000,000	< 10,000,000	≥ 10,000,000
Air-Cooled Blast Furnace Slag	Yes	Yes	Yes
Steel Furnace Slag	Yes	Yes	Yes
Sandstone	Yes	Yes	Yes
Crushed Dolomite	Yes	Yes	Note 1
Polish Resistant Aggregates	Yes	Yes	Note 1
Crushed Stone	No	No	No
Gravel	No	No	No
NOTE 1. Polish resistant aggregate or crushed dolomite may be used when blended with ACBF or sandstone but cannot exceed 50% of the coarse aggregate by weight (mass), or cannot exceed 40% of the coarse aggregate by weight (mass) when blended with SF.			

#### 411.03 Design Mix Formula

The Contractor shall submit a Design Mix Formula, DMF, for the specific materials to be used on the project to the District Testing Engineer one week prior to use. The DMF shall state the following (all percentages are based on the dry weight of the aggregate):

- source of each individual material
- The aggregation gradation shall be in accordance with the following:

Sieve Size	Surface/Leveling	Rut Fill*
3/8 in. (9.5 mm)	100	100
No. 4 (4.75 mm)	85-100	70-90
No. 8 (2.36 mm)	50-80	45-70
No. 16 (1.18 mm)	40-65	28-50
No. 30 (600 μm)	25-45	19-34
No. 50 (300 μm)	13-25	12-25
No. 100 (150 μm)	7-18	7-18
No. 200 (75 μm)	5-15	5-15
* If rut fill course is used as a surface application, the aggregates shall be in accordance with the Surface Aggregate Table above.		

- percentage of aggregate
- percentage of mineral filler (minimum and maximum)
- percentage of water (minimum and maximum)
- percentage of mix set additives (if required)
- percentage of polymer modified CSS-1h emulsified asphalt
- state the quantitative effects of moisture content on the unit weight of the aggregate
- results for the tests in the following:

<i>Characteristic</i>	<i>Test Method ISSA*</i>	<i>Requirement</i>
<i>Wet Cohesion</i> 30 Minutes, Min. (Set Time) 60 Minutes, Min. (Traffic)	<i>TB-139**</i>	12 kg-cm 20 kg-cm
<i>Wet Stripping, Min.</i>	<i>TB-114</i>	90%
<i>Wet Track Abrasion Loss</i> 60 Minutes Soak, Max.	<i>TB-100</i>	536 g/m <sup>2</sup>
<i>Saturated Abrasion</i> <i>Compatibility, Max</i>	<i>TB-144</i>	3g loss
<i>Mix Time @ 77°F (25°C)</i>	<i>TB-113**</i>	<i>Controllable to 120 s</i>
<i>Mix Time @ 104°F (40°C)</i>	<i>TB-113**</i>	<i>Controllable to 35 s</i>
* International Slurry Surfacing Association ** The TB-139 (set time) and TB-113 (mix time) tests shall be checked at the highest temperature expected during construction. For the TB-113 test at 104°F (40°C), all ingredients and containers shall be preheated.		

#### **411.04 Pre-Paving Coordination**

A pre-paving meeting between the Contractor and Engineer will be held on-site prior to beginning work. The agenda for this meeting will include as a minimum:

- (a) Contractor's detailed work schedule
- (b) traffic control plan
- (c) calibration of equipment
- (d) Design Mix Formula/Job Mix Formula
- (e) inspection and evaluation of the condition and adequacy of equipment, including units for transport of materials
- (f) Quality Control Plan in accordance with ITM 803

### **CONSTRUCTION REQUIREMENTS**

#### **411.05 Preparation of Surfaces**

The Contractor shall be responsible for all surface preparation that may affect the performance of warranted micro-surfacing. All castings, and detector housings, ~~and snowplowable raised pavement markers~~ shall be protected during application of material.

#### **411.06 Opening to Traffic**

The micro-surface shall be capable of being opened to traffic within 1 hour after application. If the micro-surface is not stable under traffic loading within 1 hour of placement, the Contractor shall immediately cease operations. Prior to resuming operations, the Contractor shall notify the Engineer of the cause and the corrective action to be taken.

#### **411.07 Finished Pavement Properties**

Pavement smoothness shall be in accordance with 401.18 except profilograph requirements will not apply. Smoothness requirements shall not apply to shoulder micro-surface placed separately.

*The longitudinal construction joints and lane edges shall coincide with the proposed painted lane lines. Longitudinal joints shall be constructed with less than a 3 in. (75 mm) overlap on adjacent passes and no more than 1/4 in. (6 mm) overlap thickness measured with a 10 ft (3 m) straight edge in accordance with 409.03(f). If applicable, overlapping passes shall be on the uphill side to prevent ponding of water. Construct neat and uniform transverse joints with no more than a 1/8 in. (3 mm) difference in elevation across the joint as measured with a 10 ft (3 m) straight edge. The lane edge shall be neat and uniform with no more than 2 in. (50 mm) of horizontal variance in any 100 ft (30 m).*

#### **411.08 Warranty**

*Upon completion of all warranted micro-surfacing and opening to unrestricted traffic, the warranty bond shall be in effect for a total of three years. The warranty bond shall be properly executed by a surety company satisfactory to the Department and be payable to the State of Indiana and submitted with the Contractor's bid.*

*The warranty bond shall be an amount equal to 100% of the contract total for the warranted micro-surfacing excluding patching or other work included in the contract. The bond is intended to insure completion of required warranty work, including payments for all labor, equipment, materials and closure periods used to remediate any warranted distresses.*

*Upon the final acceptance of the project, the contractual obligations of the Contractor are satisfied as long as the micro-surfacing continues to meet or exceed the warranted values as defined herein.*

*All warranty work shall be accomplished in accordance with 411.10. At the end of the warranty period, the Contractor will be released from further warranty work or responsibility, provided all previous warranty work has been satisfactorily completed and approved by the Department.*

#### **411.09 Conflict Resolution Team**

*The scope of work for the conflict resolution team includes all issues concerning the warranted pavement relative to the quality control plan, material selection, warranted pavement evaluations, distress indicators, remedial action, and remediation plans.*

*The team will consist of two Contractor representatives, two Department representatives, and a fifth person mutually agreed upon by both the Department and the Contractor. All costs for the fifth person will be equally shared between the Department and the Contractor.*

*The team members will be identified in writing when needed and will be knowledgeable in the terms and conditions of this warranty and the methods used in the measurement and calculation of pavement distress. The team will render a final recommendation to the Chief Engineer by a majority vote. Each member has an equal vote.*



#### **411.10 Warranty Work**

*During the warranty period, remedial work shall be performed at no cost to the Department and shall be based on the results of pavement distress surveys. Remedial work to be performed and materials to be used shall be a decision of the Contractor with approval of the Department. Prior to proceeding with any warranty work or monitoring, all necessary permits shall be obtained from the Department.*

*During the warranty period, the Contractor may monitor the warranted micro-surfacing using non-destructive procedures. All proposed remedial actions shall be coordinated with the Department.*

*Coring, milling or other destructive procedures may not be performed by the Contractor, without prior consent of the Department. The Contractor will not be responsible for damages to the pavement as a result of coring, milling or other destructive procedures conducted by the Department.*

*The Contractor will have the first option to perform the remedial work. If, in the opinion of the Engineer, the problem requires immediate attention for safety of the traveling public and the Contractor cannot perform the remedial work within 24 hours of notification the Department has the option to have emergency remedial work performed by other forces. The Contractor shall be responsible to pay for all costs incurred by the Department for emergency remedial work. Remedial work performed by other forces will not alter the requirements, responsibilities, or obligations of the warranty.*

#### **411.11 Pavement Distress Indicators, Thresholds, and Remedial Action**

*The Department will use the following pavement distress indicators throughout the warranty period:*

- (a) Rutting – transverse displacement of the micro-surfacing*
- (b) Delamination – physical separation of the micro-surfacing that exposes the underlying surface within a wheelpath*
- (c) Raveling – wearing away of the micro-surfacing*
- (d) Skid Resistance – friction number as measured by ASTM E 274 and E 524*

*The pavement threshold values for the pavement distress indicators will be evaluated for the entire length of the contract for each lane. The threshold values for the pavement distress indicators are listed below:*

	Single Location	Multiple Location/mile
Delamination	0.5 yd <sup>2</sup>	1.0 yd <sup>2</sup>
Raveling	0.5 yd <sup>2</sup>	1.0 yd <sup>2</sup>

*Rut Depth .....average 1/4 in. (6 mm)*

*Friction Number\*.....average 35, no value less than 30*

*\* Individual friction tests will be done in each lane every 1/2 mi for the length of the contract.*

*The Department may evaluate the warranted micro-surfacing during the warranty period. A final condition survey will be made by the Department and the Contractor will be notified in writing of all sections exceeding the warranty threshold at least 90 days in advance of the expiration of the warranty period.*

*If any of the threshold levels are met or exceeded, the Contractor shall recommend remedial action to the Department. After the remedial action is approved, the Contractor shall perform the remedial work.*

*Remedial action shall be taken within 30 calendar days of the date the Contractor is notified that a threshold level has been met or exceeded by the final condition survey. If threshold levels are met or exceeded within the warranty period, the Contractor shall submit for approval his recommended remedial action and work schedule.*

*If, anytime during the warranty period, 30% or more of the project ~~segment~~ requires, or ~~have~~ has received remedial action, the entire project shall receive a remedial action as determined by the Contractor and the Department. If an impasse develops, the team will make a final recommendation.*

*If remedial action work or elective/preventive action work performed by the Contractor necessitates a corrective action to the pavement markings, adjacent lanes or roadway shoulders, such corrective action to the pavement markings, adjacent lanes, and shoulders shall be the responsibility of the Contractor.*

*Warranty requirements for all remediation work will be limited to the life of the original contract warranty.*

*If any of the threshold levels are met or exceeded and the Contractor does not agree to the pavement distress survey or the Department does not agree with the proposed remedial action, the team will provide a recommendation within 30 calendar days.*

*The Contractor will not be held responsible for distresses that are caused by factors beyond the control of the Contractor. The Contractor shall be responsible for materials and workmanship problems.*

#### **411.12 Elective/Preventive Action**

*Elective or preventive action may be performed by the Contractor with concurrence from the Department.*

#### **411.13 Department Maintenance**

*The Department will perform routine maintenance operations during the warranty period such as plowing, applying de-icing chemicals, repairs to safety appurtenances, pavement markings, mowing and sign maintenance. The Department, during the warranty period, will perform no routine pavement surface maintenance activities.*

#### **411.14 Method of Measurement**

*Micro-Surfacing, Warranted, of the type specified will be measured by the square yard (square meter) of the surface course. The width of the surface course will be the width placed. The length of the surface course will be measured along the centerline of each roadway or ramp.*

*Only the micro-surface surface course will be measured for payment.*

## REVISION TO RECURRING SPECIAL PROVISION

411-R-432 WARRANTED MICRO-SURFACING, CONTINUED.

**411.15 Basis of Payment**

*The accepted quantities for this work will be paid for at the contract unit price per square yard (square meter) of micro-surface, warranted, of the type specified, complete in place.*

*Payment will be made under:*

**Pay Item****Pay Unit Symbol**

*Micro-Surfacing, Warranted, Single Course .....SYS (m2)*

*Micro-Surfacing, Warranted, Multiple Course.....SYS (m2)*

*The cost of furnishing materials, equipment, labor, maintenance of traffic, underlying micro-surface courses, and tack coat, if required, and all incidentals shall be included in the cost of micro-surfacing, warranted, of the type specified.*

**411.16 Final Warranty Acceptance**

*The Engineer will review the project in the field for any obvious general defects not addressed in the indicators and recommend a Final Warranty Acceptance. The Construction Management Division will issue the Contractor a Final Warranty Acceptance letter.*

Other sections containing  
specific cross references:

None

General Instructions to Field Employees  
Update Required? No

Frequency Manual  
Update Required? No

Recurring Special Provisions  
potentially affected:

See Above

Standard Sheets potentially affected:

None

Motion: Mr. Andrews  
Second: Mr. Kuchler  
Ayes: 9  
Nays: 0

Action: Passed as submitted

☒ RSP Effective: January 2009 Letting  
RSP Sunset Date: \_\_\_\_\_  
☐ RPD Effective: \_\_\_\_\_ Letting  
☐ 20\_\_ Standard Specifications Book  
☐ 20\_\_ Standards Edition  
☐ Technical Advisory

Received FHWA Approval? Yes

**NOTE:** This action revises the RSP created based on approval of Item 08-11-1 at the July 17, 2008 Standards Committee meeting. The RSP authorized at the July meeting was to have an effective date of January 1, 2009. The revised RSP will have the same effective date.

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The INDOT Technicians performing inspection at the various fabrication facilities have commented that the current 707 specification needs updating. Right now the fabrication facilities do not have to be certified, they just need to be "an approved plant". Also, the mild reinforcing steel used in the manufacturing of beams is allowed to be welded and is being welded, but is not a weldable grade of steel. Other minor issues such as requirements for the temperature of concrete at the time of placement and the size of the cylinders are also not addressed.

PROPOSED SOLUTION: Review the 707 section of the SS. Incorporate NPCA & PCI certification programs into the specification via ITM 814. Give the fabrication facility the option to either tie or weld the reinforcing cages however, if they are welded, A 706 (weldable reinforcing steel) shall be used. Other minor issues such as temperature limits on the concrete at time of placement, similar to that contained in 702 were addressed. (Standards Committee has already passed a proposal to remove information related to strand breaks from the standard drawings and incorporate into the SS. See Items from September 2007, 08-4-3 & 08-4-4.)

APPLICABLE STANDARD SPECIFICATIONS: 707, 910.01(a), 910.01(b)2, 910.01(b)7, 910.01(b)9

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: new GIFE section 707

APPLICABLE RECURRING SPECIAL PROVISIONS: None

Submitted By: Ron Heustis for Jim Reilman (chairman 700 spec subcommittee)

Title: Manager, Construction Technical Support

Organization: INDOT

Phone Number: 317-234-2777

Date: April 15, 2008

APPLICABLE SUB-COMMITTEE ENDORSEMENT? 700 Spec Subcommittee. Also have provided Industry an opportunity to review & comment.

## REVISION TO 2008 STANDARD SPECIFICATIONS

SECTION 707, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

**SECTION 707 – PRECAST AND PRECAST PRESTRESSED CONCRETE  
STRUCTURAL MEMBERS****707.01 Description**

This work shall consist of the ~~construction and~~ *fabrication*, furnishing, and *installation* of reinforced *precast* or *precast* prestressed concrete structural members or, if specified, concrete deck panels cast outside the structure, transported to, and incorporated into the structure, *all* in accordance with 105.03.

**707.02 Materials**

Materials shall be in accordance with the following:

<i>Admixture for Concrete</i> .....	912.03
Coarse Aggregates, Class A or Higher, Size No. 91.....	904
Concrete Curing Materials <del>and Admixtures</del> .....	912
Concrete Sealers.....	909.09, 909.10
Elastomeric Bearings .....	915.04
Fine Aggregates, Size No. 23.....	904
Fly Ash.....	901.02
Portland Cement.....	901.01(b)
Prestressing <del>Steel Strand</del> .....	910.01(b)7
Reinforcing <del>Steel Bars</del> .....	910.01

Structural steel for steel intermediate diaphragms shall be in accordance with 910.02(a) and shall be galvanized in accordance with ASTM A 123 after cutting, bending, and welding. Bolts for steel intermediate diaphragms shall be 7/8 in. (22 mm) and in accordance with ~~910.02(e)~~ 910.02(f), except they shall be type 1. All bolts, nuts, washers, and similar threaded fasteners shall be galvanized in accordance with ASTM A 123 or may be mechanically zinc coated in accordance with ASTM B 695, class 50.

**707.03 General Requirements**

Structural members including ~~bridge slabs~~, *concrete deck panels*, box-beams, and I-beams, and *bulb-T beams* shall be manufactured in an *Department* approved plant ~~where strict control over manufacturing and curing procedure is maintained at all times in accordance with ITM 814~~. Dimensions and design requirements for structural members shall be as shown on the plans. Lengths and dimension tolerances shall be as shown on the plans or as otherwise specified.

*A beam whose dimensions exceed the tolerances shown on the plans or as otherwise specified will be rejected for shipment to the project site. A beam which is to include a field attached curb shall have curb reinforcement located longitudinally within 3/4 in. (20 mm) of the locations shown on the plans.*

~~Wire breaks will be permitted to remain on the prestressed concrete casting bed as follows:~~

<i>Number of Strands in Bed</i>	<i>Wire Breaks</i>
<i>19 or Fewer</i>	<i>0</i>
<i>20 through 39</i>	<i>1</i>
<i>40 through 59</i>	<i>2</i>
<i>60 or More</i>	<i>3</i>

~~The ends of each permitted wire break shall be tied to the strand. If more than the permissible number of wire breaks appears in a particular strand pattern, or if more than one broken wire appears in an individual strand, such strands shall be removed and replaced.~~

~~The tolerance for the center of gravity for a prestressing strand group shall be  $\pm 1/4$  in. ( $\pm 6$  mm). The tolerance for the longitudinal position of handling devices shall be  $\pm 6$  in. ( $\pm 150$  mm).~~

Structural steel diaphragms shall be fabricated and erected in accordance with 711. Steel diaphragms shall include all connection angles, plates, and associated hardware required for a complete installation. The Contractor shall replace, re-galvanize, or repair all damaged galvanized material at the discretion of the Engineer.

If detailed design drawings are not included in the plans, ~~one set of design computations and four sets of detailed shop drawings~~ shall be submitted for approval in accordance with 105.02. ~~The submitted drawings shall be 22 in. by 34 in. (560 mm by 860 mm) in overall size. These shop drawings will be reviewed for design features only. The Contractor shall be responsible for dimensions, accuracy, and fit of work.~~ Certified mill test reports shall be furnished for all high tensile steel strands. If a method of handling members other than that described in 707.08 is to be used, it shall be shown on the shop drawings. Fabrication shall not begin until the shop drawings are approved. The Contractor shall allow 14 days in the project schedule for the review of shop drawings.

Prior to the beginning of fabrication, a prefabrication meeting shall be held at the fabrication facility or another agreed-upon location. The meeting shall be conducted by the fabricator and attended by the fabricator's production supervisor and quality control inspector, and the Engineer. The fabricator shall take notes of the meeting and distribute copies to all attending parties within five days of the date of the meeting. Items to be discussed at the meeting shall include a minimum of: fabrication and shipping schedule including hours of operation; line of communication between fabricator and Engineer; material test reports; shop drawings; special fabrication methods; fabrication hold points for inspection; final inspection and acceptance of materials; method of shipment. The requirement to hold prefabrication meetings may be waived by the Department, if the Department so chooses.

Where temperature requirements are specified herein, the fabricator shall provide the Department with written verification that the temperature requirements have been met.

## CONSTRUCTION REQUIREMENTS

### 707.04 Steel and Concrete Requirements

**(a) Reinforcing Steel Bars**

A tight coat of concrete grout *extending 1/2 in. maximum from the top of precast and precast prestressed concrete members* will be permitted to remain on ~~stirrups~~ reinforcing bars extending from precast and precast prestressed members. All loose and flaky material on these reinforcing bars shall be removed. Lap splices shall be in accordance with 703.06.

**(b) Welding Reinforcing Steel**

In lieu of tying, reinforcing steel bars except prestressing steel strands may be welded in accordance with the following: 703.06.

- ~~1. Welding will be permitted only at intersections of bars. Splicing of the reinforcing steel by welding will not be permitted. Welds shall have a satisfactory appearance. There are no numerical strength requirements for the completed welds. However, they shall be of such strength as to adequately hold the crossing bars in their true position during the placement of concrete. As low a current as possible shall be used so as to preclude notching and undercutting and still provide a weld of the intended strength. Notching or undercutting of the bars will be cause for rejection of the bars so damaged and the bars shall be replaced as directed.~~
- ~~2. Welding shall be by the shielded metal arc process using only electrodes with low hydrogen classifications E7015, E7016, E7018, or E7028 in accordance with AWS A5.1. No minimum preheat or interpass temperature is required, except that welding shall be done only when the base metal temperature is above 35°F (2°C). The low hydrogen electrodes shall be dried for at least 2 h at a temperature between 450°F (232°C) and 500°F (260°C) before they are used. Electrodes shall be stored immediately after drying in a storage oven held at a temperature of at least 250°F (121°C). Electrodes that are not used within 4 h after removal from a drying or storage oven shall be re-dried before use. Electrodes which have been wet shall not be used.~~
- ~~3. All welding procedures and welders to be employed shall be qualified by tests as prescribed below. Evidence may be accepted of previous qualification of the welding procedures and welders to be employed. The same bar stock and type of welding equipment that is required for fabrication of the steel shall be used in qualifying welding procedures and welders. Welding procedures shall be qualified by preparing and testing two sample welds of each combination of bar size and steel type to be welded at intersections in the construction work. Each sample shall be subjected to a tensile test across the point of the weld. The specimens shall develop the minimum requirements for tensile strength and yield strength of the bar stock. However, failure to be in accordance with the percentage of elongation specified for the steel bars used will not be cause for disqualifying the welding procedure or the welder.~~
- ~~4. Welders shall be qualified by preparing and testing samples in the same manner as specified above for qualification of welding~~

~~procedures. Preparation of welds for qualifying procedures and welders shall be done in the presence of the Engineer. Such inspection shall be requested at least five days in advance. All necessary equipment, personnel, and materials shall be assembled and any experimental work performed so that qualification of welders and welding procedures can be concentrated on a reasonably short and continuous period of time. The cost of qualifying the welders and welding procedures shall be at the expense of the Contractor and will be considered incidental to and included in the pay item for structural members, except that testing of the specimens will be performed by the Department at no expense to the Contractor.~~

**(b) Prestressing Strands**

*The splicing of straight prestressing strands is acceptable provided that the location of the splice does not occur within the concrete member and the splices meet AASHTO M 203. Splicing of draped strands is not allowed. Spliced prestressing strands shall have the same twist or lap. For single strand tensioning slippage of the splices should be considered in computing the elongation. For multiple strand tensioning, either all of the strands shall be spliced or not more than 10% of the strands. If all of the strands are spliced the average splice slippage shall be considered in computing the elongation. If 10% or less of the strands are spliced, slippage allowance shall be required.*

*Wire breaks will be permitted to remain on the prestressed concrete casting bed as follows:*

<i>Number of Strands in Bed</i>	<i>Wire Breaks</i>
<i>19 or Fewer</i>	<i>0</i>
<i>20 through 39</i>	<i>1</i>
<i>40 through 59</i>	<i>2</i>
<i>60 or More</i>	<i>3</i>

*The ends of each permitted wire break shall be tied to the strand. If more than the permissible number of wire breaks appears in a particular strand pattern, or if more than one broken wire appears in an individual strand, such strands shall be removed and replaced.*

*The tolerance for the center of gravity for a prestressing strand group shall be  $\pm 1/4$  in. ( $\pm 6$  mm). The tolerance for the longitudinal position of handling devices shall be  $\pm 6$  in. ( $\pm 150$  mm).*

**(c) Concrete**

Concrete shall be air entrained and in accordance with the applicable requirements of 702.05. *The concrete shall have a minimum temperature of 50°F (10°C) and a maximum temperature of 90°F (32°C) at the time of placement.* Chemical admixture types A, D, F, or G shall be used in combination with an air entraining admixture. High range water reducing, HRWR, and high range water reducing retarding, HRWRR, admixture systems may be used. Chemical admixture types B, C, and E will be permitted only with written permission. Admixtures, other than air-entraining admixtures, shall not be used with air-entrained cement. The cement content of the mixed concrete shall be sufficient to obtain the specified minimum 28 day compressive strength. The



total of portland cement and other cementitious materials shall not exceed 800 lb/cyd (475 kg/m<sup>3</sup>). Slump shall be no less than 2 in. (50 mm) nor more than 5 in. (125 mm) for concrete without chemical admixtures or concrete containing chemical admixture types A and D.

Concrete containing admixture type F, G, or admixture systems shall have a slump no less than 3 in. (75 mm) nor more than 7 8 in. (~~175~~ 200 mm). The amount of time from mixing to placement and consolidation shall be a maximum of 30 min. The concrete shall not be retempered with additional amounts of chemical admixture types F or G after the initial mixing has been completed.

### **1. Cold Weather Concrete**

*The provisions of 702.11 shall be followed when it is necessary to fabricate concrete structural members when the atmospheric temperature is at or below 35°F (2°C). In addition to the requirements of 702.11, two maximum-minimum type thermometers shall be provided in the enclosure.*

### **2. Hot Weather Concrete**

*When it is necessary to fabricate concrete structural members during times of hot weather the mix water may be chilled or an appropriate amount of ice may be added to the concrete mix in order to produce concrete of the temperature specified in 707.04(c).*

### **3. Acceptance Testing**

*Acceptance of concrete used in work described in this section will be based on slump, air content, and 28 day compressive strength. The fabricator shall make a minimum of two 6 in. dia. x 12 in. test cylinders per member cast for compressive strength determination at 28 days. The test cylinders shall be made and receive a standard cure in accordance with ASTM C 31. Additional test cylinders for process control may be made and tested prior to 28 days; however the compressive strength shall still be performed on the 28 day test cylinders. The fabricator shall control prestressing operations and shipment of structural members through the use of compressive strength test cylinders that are field cured in accordance with ASTM C 31. Test cylinders shall be tested in accordance with ASTM C 39. The results of the 28 day test cylinders will determine acceptance or rejection of the concrete in accordance with one of the following options.*

- a. If the compressive strength of all cylinders tested for a group are equal to or greater than the design concrete strength, the compressive strength of the concrete in that group of members will be accepted.*
- b. If the average compressive strength of all cylinders tested is equal to or greater than the design concrete strength, not more than 10.0% of the cylinders tested have a compressive strength less than the design concrete strength, and no cylinder tested has a compressive strength less than 80.0% of the design concrete strength, then the compressive strength of the concrete in the group of members will be accepted.*

- c. *If the compressive strength or average compressive strength does not comply with 707.04(c)3 a or b, the acceptability of the member will be determined by the Department.*

*Failure to meet the strength requirements will be cause for rejection of the concrete member for which the cylinders represent. All molds, facilities, and materials necessary to prepare and cure the test specimens shall be furnished.*

Precast concrete members which are not prestressed shall have a minimum compressive strength of 4500 psi (31 MPa) in 28 days. *Precast prestressed* members shall be in accordance with the following unless otherwise shown on the plans:

1. Maximum water/cementitious ratio in pounds (kilograms) of water per pound (kilogram) of cementitious material shall be 0.400.
2. Minimum 28 day compressive strength of concrete shall be 5000 psi (34.5 MPa).
3. Minimum compressive strength of concrete at time of prestressing shall be 4000 psi (27.6 MPa).
4. Initial tension of prestressing ~~steel strands~~ shall be as shown on the plans.

Inspection of the precast *prestressed* member during manufacture and checking and testing aggregates, cement, concrete, and steel specimens will be performed. All specimens shall be furnished without cost to the Department. ~~Notification shall be made as soon as reinforcing steel is available for sampling and testing, and also at least five days in advance of the beginning of the manufacture of the precast member. This inspection, checking, and testing performed by the Department will not relieve the Contractor or his manufacturers the fabricator from performing their own quality control inspection, testing, and checking as necessary to maintain strict quality control over the manufacturing, handling, and curing procedure. By means of a mechanical recording device, a~~ A permanent record of the ~~force applied~~ *measured elongation obtained* to each *prestressing strand of prestressing steel* and the identification of the strand and unit to which the record applies shall be provided. *This record shall be certified and provided to the Engineer.*

#### **707.05 Forms**

Structural members shall be manufactured in steel forms which are unyielding, *smooth*, mortar-tight, and of sufficient rigidity to prevent distortion due to pressure of the concrete. They shall be so designed that the finished concrete is in accordance with the required dimensions and contours. The design of the forms shall take into account the effect of vibration of the concrete as it is placed. Forms shall be filleted at all sharp corners and shall be given a bevel or draft at all projections to ensure easy removal. Exposed edges of curbs shall be beveled or edged. Forms shall be set and maintained true to the lines designated until the concrete is sufficiently hardened or for periods hereinafter specified. Interiors of forms shall be treated with an approved formulated form coating which allows them to be released without adhering, discoloring, or otherwise damaging the concrete. Form coating materials shall not come in contact with reinforcing *bars* or prestressing ~~steel strands~~.

#### **707.06 Placing and Finishing Cement Concrete**

*The temperature of the prestressing strands and forms shall be monitored between the time of the application of prestressing force and the placement of the concrete. During hot weather, appropriate approved means shall be undertaken to cool the prestressing strands and forms immediately prior to placement of the concrete.*

Concrete, during and immediately after depositing, shall be consolidated with vibrators and suitable spading tools. Vibration shall be applied at the point of deposit and in the area of freshly deposited concrete. The vibrators used may be internal, external, or a combination of both. Internal vibration shall be of sufficient duration and intensity to consolidate thoroughly, but shall not be continued so as to cause segregation. Vibration shall not be continued at any one point so that localized areas of grout are formed.

The entire operation of depositing and consolidating the concrete shall be conducted so that the concrete will be smooth, dense, and free from any honeycomb or pockets of segregated aggregates. The concrete in each member shall be placed in one continuous operation. The outside vertical faces of fascia girders and the exposed face and top of the curb section shall be finished in accordance with 702.21.

*Voids in prestressed-concrete box beams shall be vented during beam production until after the initial concrete set, then sealed before the beams are shipped.*

The tops of all beams and the outside faces *and bottom flanges* of the fascia beams shall be sealed with an approved concrete sealer in accordance with 709.

#### **707.07 Removal of Forms and Curing**

Side forms may be removed when no distortion, slump, or misalignment of the concrete will result. Precast members which are not prestressed shall remain on the bottom supporting forms for the span until the concrete has reached a strength of at least 2,000 psi (13.8 MPa) as evidenced by test cylinders made and cured in the same manner as the slab.

Curing may be done by wet curing or by accelerated curing.

When wet curing is used, the exposed surfaces of the members shall be covered by two layers of wet burlap and the burlap shall be kept wet. Additional curing of precast or *precast* prestressed units will not be required provided the minimum specified ultimate strength can be obtained.

When accelerated curing of the concrete is used, it shall be done by low pressure steam or radiant heat curing. Insulated blankets may be used to reduce heat and moisture loss subject to maintaining a 50°F (10°C) minimum temperature. The heat shall always be applied at a controlled rate following the initial set of the concrete, and an effective method of retaining the heat and moisture in the concrete shall be used during the curing cycle.

Curing shall be in a suitable enclosure to minimize heat and moisture loss. Except to maintain a minimum temperature of 50°F (10°C), heat shall not be applied until the concrete has attained its initial set. The time of initial set may be determined by ASTM C 403. When the initial set is not determined by ASTM C 403, the initial application of

heat shall be from 2 to 4 h after final placement. If retarders are used, this time shall be increased to 4 to 6 h.

During the initial application of radiant heat or live steam, the ambient temperature within the curing enclosure shall increase at an average rate not exceeding 40°F/h (5°C/h) until the curing temperature is reached. Neither the maximum temperature within the enclosure nor the maximum temperature on the surface of the concrete shall exceed 160°F (71°C). The maximum curing temperature shall be held until the concrete has reached the minimum required strength for moving precast *and precast prestressed* units. *In discontinuing the steam application, the air temperature inside the enclosure shall decrease at a rate not to exceed 70°F/h (20°C/h) until the temperature has reached 20°F above the temperature of the air to which the concrete will be exposed. Recording thermometers shall be provided and used to check these temperature requirements.* Detensioning should be accomplished immediately after accelerated curing has been discontinued, *provided the member has met or exceeded the specified release strength. When multiple members are cast in the same bed, all members shall meet or exceed the specified release strength prior to detensioning.* Additional curing of precast or precast prestressed units will not be required provided the minimum specified ultimate strength can be obtained.

Radiant heat may be applied by means of pipes circulating steam, hot oil or hot water, or by electric heating elements. When steam is used, the jets shall be positioned so that they do not discharge directly on the concrete, forms, or test cylinders. ~~the~~ The steam shall be at 100% relative humidity to prevent loss of moisture and to provide moisture for proper hydration of the cement.

During the period of initial set of the member and during the accelerated curing by radiant heat, the concrete shall be kept wet by the method outlined above for wet curing.

~~A recording thermometer shall be provided and used to verify compliance with the temperature requirements.~~

Approval shall be obtained before curing is done by any means other than those outlined above.

#### **707.08 Handling and Shipping**

~~The precast~~ Precast *and precast prestressed* members shall not be subjected to excessive abuse which produces crushing or undue marring of the concrete. All members damaged during handling, storing, transporting, or erecting shall be replaced. Unless some other method is approved, precast *and precast prestressed* members shall be handled with a suitable hoisting device provided with a spreader sling. The spreader shall be of sufficient length to prevent horizontal forces being produced in the member due to lifting and shall be equipped with leads and hooks at each end. The girders shall be lifted by the devices shown on the plans. Alternate lifting devices and procedures shall be at the owner's or supplier's option, and must be approved prior to use. ~~If any other method of handling is used, it shall be shown on the shop drawings and approved prior to use.~~ If the method produces horizontal forces in the precast *or precast prestressed* member, sufficient steel reinforcement shall be added to compensate for them.

The members shall remain in an upright position at all times and shall be supported as indicated herein when in storage and during transportation to the construction site.

In storage, I-beams, box-beams, and slabs shall be fully supported across their width on battens not less than 4 in. (100 mm) wide with one being placed at each end at the centerline of the bearing. The supports of the members while in storage shall be maintained in a level position so no twisting occurs.

~~The precast~~ *Precast* members shall not be shipped nor used until the concrete reaches a strength of 4,500 psi (31 MPa) for members which are not prestressed and 5,000 psi (34.5 MPa) for members which are prestressed as evidenced by test cylinders made at the time of casting and cured in the same manner as the ~~precast~~ members which they represent. If they are shipped prior to 28 days, additional test cylinders shall be made to ensure adequate 28 day results in case of earlier failure.

During transportation, the members shall be supported with truck bolsters or battens no less than 4 in. (100 mm) wide which are padded with no less than 1/2 in. (13 mm) of rubber. The ends of I-beams shall extend no more than the depth of the beam and not more than 3.5 ft (1 m) beyond the supports. The ends of box-beams shall extend no more than 1 1/2 times their depth and not more than 3 ft (0.9 m) beyond the supports. The ends of slabs shall extend no more than the depth of the beam beyond the supports. Supports of cantilever beams shall be as shown on the plans. Trucks with double bolsters will be permitted, provided the beams are fully seated on the outer bolsters and the inner bolsters are no more than 8 ft (2.4 m) from the ends of the beams. Wood blocks or other suitable material shall be placed under the tie chains to prevent chipping the concrete.

#### **707.09 Placing Structural Members**

Erection of ~~the~~ *precast prestressed structural members* ~~deck~~ shall commence at the centerline and proceed out to the curb, one member at a time. As each member is placed, the transverse tie bars, if shown on the plans, shall be inserted and secured. Any shifting of the members shall be done while they are held free of the supports by the hoisting device. The use of a steel pinch bar will not be permitted. Members shall be set to proper line and grade with uniform bearing on bridge seats, mortar joints, or bearing pads as required on the plans. When required, members shall be secured to the pier or bent with dowel rods. Holes for dowels shall be filled with mortar at fixed ends and with crack or joint filler at expansion ends. Longitudinal keyway joints shall be cleaned. A coat of cement mortar shall be scrubbed on the surface. The joint shall be filled with a non-shrinking grout composed of one part portland cement, two parts No. 23 fine aggregate, and an approved non-shrinking additive or a non-shrink, non-metallic cementation grout in accordance with ASTM C 1107. All bolts or drains shown on the plans as necessary or desirable to be placed in the concrete shall be placed by the methods and at the locations shown on the plans. Necessary tie rods, tie bolts, and hardware for tying members together shall be furnished.

Dowel holes shall not be grouted nor concrete or the forming ~~therefor~~ *thereof*, be placed in floor slabs, diaphragms, or shear keys prior to receipt of complete documentation of the acceptability of the members and bearing pads, including the satisfactory laboratory reports and certifications in accordance with 915.04(e). Neither the members, nor the bearings will be considered incorporated into the work, and neither will be paid for until this documentation is accomplished satisfactorily.

Railing, when required, shall be of the type shown on the plans. The component parts shall be in accordance with 706, unless otherwise indicated on the plans. Other precast or *precast* prestressed structural members shall be placed in the structure in accordance with the plans and the specifications or special provisions indicated for the type of structure being built.

Cranes or other heavy erection equipment may be operated on the precast or *precast* prestressed members only if approved in writing and if a proposed operating procedure is submitted showing loading, distribution of loads, resulting stresses, and that the design of the members is satisfactory to permit. However, such approval shall not relieve the Contractor of any damage from this operation.

#### **707.10 Precast Prestressed Concrete Deck Panels**

Precast prestressed concrete deck panels shall be designed as a non-composite section to support the dead load of the panel, reinforcement, plastic concrete, and a construction load of 50 lb/ft<sup>2</sup> (2.4 kPa). The panel shall be designed as a composite section with the class C concrete to support the live load. The Contractor shall revise the area of top longitudinal reinforcing ~~steel bars~~ over interior supports for negative moment to be equal to the total area of top and bottom longitudinal reinforcing ~~steel bars~~.

Shop drawings ~~and design computations~~ shall be submitted in accordance with ~~707.03~~ 105.02. Design computations ~~for deck panels~~ shall be submitted ~~for approval only~~ for total slab thicknesses greater than 8 in. (200 mm) or clear spans in excess of 7.5 ft (2.3 m). Design shall be in accordance with the AASHTO ~~Standard~~ *Load Resistance Factor Design Bridge Specifications for Highway Bridges*. Details such as type, size, and location of the reinforcing ~~steel bars~~, the prestressing strands, welded wire ~~fabric~~ reinforcement, and concrete shall be as shown on the plans.

The concrete for deck panels shall be placed in accordance with 702.20. The concrete shall be vibrated to prevent honeycombs and voids, especially at the corners and edges of the panels. The tops of the deck panels shall be broom or wire brush finished in the direction of the prestressing strands. The corrugations formed shall be uniform in appearance and shall not be more than 1/4 in. (6 mm) in depth. The coarse aggregate shall not be displaced when preparing the roughened surface.

#### **707.11 Method of Measurement**

Precast or *precast* prestressed concrete structural members will be measured by the linear foot (meter) along the top of each member or by the square foot (square meter) of top surface of each member. Railing will be measured in accordance with 706.05 if specified as a pay item. Structural steel for intermediate diaphragms will not be measured.

#### **707.12 Basis of Payment**

The accepted quantities of precast or *precast* prestressed concrete structural members will be paid for at the contract unit price per linear foot (meter) or per square foot (square meter) for structural member, concrete, of the type and size specified. Precast or *precast* prestressed concrete structural members for which the type and size is not shown in the Schedule of Pay Items will be paid for at the contract lump sum price for structural members, concrete.

Railing will be paid for in accordance with 706.06 when specified as a pay item.

Payment will be made under:

Pay Item	Pay Unit Symbol
Structural Member, Concrete, _____, _____ type size	LFT (m)
<i>Structural Member, Concrete, _____, _____</i> <i>type size</i>	SFT (m2)

Reinforcing ~~steel~~ bars, elastomeric bearing pads, bearing beams required for box beams, bearing assemblies required for I-beams, bulb-T beams, and box beams, bearing plates, expanded polystyrene, threaded reinforcing bars, threaded inserts in fascia beams, hex bolts, sealer on the outside face *and bottom flange* of fascia beams and on the tops of all beams, and necessary incidentals shall be included in the cost of ~~this work~~ *the pay items of this section. The cost for providing all molds, facilities, and materials necessary to prepare and cure the test specimens required for work in this section shall be included in the cost of the pay items of this section.*

No payment will be made for *removing and replacing prestressing strands due to excessive wire breakage, or replacing precast or precast prestressed members damaged during handling, storing, transporting or erecting.*

The cost of railing shall be included in the cost of ~~this work~~ *the pay items of this section* if such railing is not specified as a pay item.

The cost of all materials, including galvanizing, labor, and equipment for furnishing and installing steel intermediate diaphragms shall be included in the cost of structural member, concrete of the type and size specified.

## REVISION TO 2008 STANDARD SPECIFICATIONS

## SECTION 707, CONTINUED.

**COMMITTEE COMMENTS:**

Ms. Rearick presented this item and Item 8-12-7 because Mr. Heustis was acting Chairman.

Mr. Cales noted that the revision has pay items in both square feet and linear feet. He suggested deleting the square foot pay item and using linear feet for both pay items.

Mr. Andrews mentioned that camber is an issue that should be addressed.

Mr. Dirks commented that Keith Hoernschemeyer, FHWA Indiana Division Bridge Engineer, was awaiting comments on this specification from a subject matter expert, so FHWA would prefer to withhold approval of this item until Mr. Hoernschemeyer receives comments.

Mr. Reilman was requested to set a meeting with Mr. Hoernschemeyer of FHWA, Ron Walker, Anne Rearick and Steve Fisher to resolve comments and submit a revised proposal.

Other sections containing  
specific cross references:

702.13(f) Pg 459  
707.10 Pg 497

Recurring Special Provisions  
potentially affected:

None

Motion: M  
Second: M  
Ayes:  
Nays:

General Instructions to Field Employees

Update Required? Y\_\_\_ N\_\_\_

By - Addition or Revision

Frequency Manual

Update Required? Y\_\_\_ N\_\_\_

By - Addition or Revision

Standard Sheets potentially affected:

None

Action: Withdrawn



## REVISION TO 2008 STANDARD SPECIFICATIONS

SECTION 910, BEGIN LINE 3, DELETE AND INSERT AS FOLLOWS:

**910.01 Reinforcing Bars and Dowel Bars****(a) General**

Unless otherwise specified, bars for concrete reinforcement shall be deformed billet steel, grade 60 (420). Tie bar assemblies used in lieu of bent tie bars shall be in accordance with the minimum total ultimate strength and minimum total yield strength requirements specified for bent tie bars; bend test and elongation will not be required.

~~Reinforcing steel Reinforcement~~ used in precast or precast prestressed concrete structural members, including deck panels, shall be in accordance with ASTM A 615 grade 60 (A 615M, Grade 420) ~~if it is to be tied. Reinforcing used in precast or precast prestressed concrete structural members, including deck panels, shall be in accordance with or ASTM A 706 grade 60 (A 706M grade 420) if it is to be welded.~~

Reinforcing bars shall be furnished by selecting bars made by a manufacturer on the list of Certified Uncoated Reinforcing Bar Manufacturers and in accordance with ITM 301. When shipped to the project site, the reinforcing bars shall be accompanied by the type of certifications specified in ITM 301 and in accordance with 916.

SECTION 910, BEGIN LINE 26, DELETE AND INSERT AS FOLLOWS:

**2. Threaded Tie Bar Assembly**

The threaded tie bar assembly shall be deformed billet steel, grade 60 (420) *or higher*, in accordance with 910.01(b)1 and a coupling device. The tie assembly shall achieve a minimum load of 76.144 kip/in.<sup>2</sup> (525 MPa). *Where epoxy coated threaded tie bar assemblies are specified, A an epoxy coating with a minimum film thickness of 6 mils (150 µm) shall be applied to the coupling device and epoxy coated reinforcing bars shall be provided in accordance with 910.01(b)9 with the exception that the epoxy coated bar is not required to be furnished from the list of Certified Reinforcing Bar Epoxy Coaters.*

SECTION 910, BEGIN LINE 77, DELETE AND INSERT AS FOLLOWS:

**7. Uncoated 7 Wire Strand for Prestressed Concrete**

Uncoated 7 wire strand for prestressed concrete shall be in accordance with ASTM A 416. The strand shall have the minimum tensile strength ~~of~~ and initial tension shown on the plans.

~~Low relaxation strand with a nominal diameter of 1/2 in. (12.70 mm) and a cross sectional area of 0.167 in.<sup>2</sup> (108 mm<sup>2</sup>) shall have a breaking strength of 45,000 lb (20 400 kg).~~

Uncoated 7 wire strand shall be covered by ~~the type of certification specified in the Frequency Manual and a type A certification~~ in accordance with 916. *The certification shall include the lot number, size, cross-sectional area, yield strength, breaking strength, strand composition, modulus of elasticity, and a load-elongation curve for each size of strand supplied.*

### 9. Epoxy Coated Reinforcing Bars

Epoxy coated reinforcing bars shall be furnished by selecting bars coated from an applicator's plant on the list of Certified Reinforcing Bar Epoxy Coaters and in accordance with ITM 301. The epoxy coating material shall be selected from the list of approved Epoxy Coating for Steel.

Epoxy coated reinforcing bars shall be in accordance with ASTM A 775 (A 775M), except as follows.

- a. the ~~steel~~ bars shall be in accordance with 910.01(b)1;
- b. the coating color shall contrast with the color of iron oxide;
- c. tensile and bend tests shall be performed on the bars. If an examination of the bend test specimen suggests the need, the adhesion of the coating shall be checked by subjecting additional specimens to the 120° bend test. Hairline cracks without bond loss will be acceptable provided there are not more than two and the length of either crack does not exceed 1/4 in. (6 mm). The *average* coating thickness shall be 8 9 to 13 14 mils (~~200 to 325~~ 225 to 350  $\mu$ m) after cure. The thickness measurements shall be made in accordance with ASTM G 12. ~~The average shall be coating thickness shall be an average based on 12 individual readings with no individual reading below 9 mils (225  $\mu$ m).~~ No specific correction for the base preparation process shall be applied to the thickness measurements.
- d. ~~epoxy coated reinforcing bars which will be jobsite sampled shall be accompanied by the types of certifications in the Frequency Manual and in accordance with 916.~~ Epoxy coated reinforcing bars furnished by coaters on the list of approved Certified Reinforcing Bar Epoxy Coaters shall be accompanied by the types of certifications specified in ITM 301 and in accordance with 916.
- e. repair and handling procedures shall be in accordance with 703.04. The coating material shall be in accordance with the Annex to ASTM D 3963 (D 3963M).

Epoxy coated support devices for epoxy coated reinforcing bars shall be in accordance with ASTM A 775 (A 775M), except as follows.

- a. the steel shall be in accordance with 910.01(b)1;
- b. the coating color shall contrast with the color of iron oxide;
- c. the coating thickness shall be 6 to 20 mils (150 to 500  $\mu$ m) after cure. The thickness measurements shall be made in accordance with ASTM G 12.

## REVISION TO 2008 STANDARD SPECIFICATIONS

## SECTION 910, CONTINUED.

**COMMITTEE COMMENTS:**

Mr. Heustis, Acting Chair, asked that the following clarifications be made for the committee within one week (by October 23, 2008):

Ms. Rearick will verify if the nominal strand diameter is stated on the Standard Drawings or plans.

Mr. Reilman will identify specific information required in the type A certification.

Mr. Walker and Mr. Reilman will confirm that the wording of 910.01(b)2 is correct.

*NOTE: Clarifications were received and item is correct as shown in these minutes.*

Other sections containing  
specific cross references:

910.01(b)2

703.02 Pg 477

703.06 Pg 479

910.01(b)7

707.02 Pg 490

910.01(b)9

503.02 Pg 308

609.02 Pg 369

703.02 Pg 477

703.04 Pg 478

Recurring Special Provisions  
potentially affected:

None

Motion: Ms. Rearick

Second: Mr. Cales

Ayes: 9

Nays: 0

General Instructions to Field Employees  
Update Required? No

Frequency Manual

Update Required? No

Standard Sheets potentially affected:

None

Action: Passed as revised

\_x\_ RSP Effective: January 2009 Letting  
RSP Sunset Date: \_\_\_\_\_

\_\_\_\_ RPD Effective: \_\_\_\_\_ Letting

\_x\_ 2010 Standard Specifications Book

\_\_\_\_ 20\_\_ Standards Edition

\_\_\_\_ Technical Advisory

Received FHWA Approval? Yes

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The AASHTO Bridge Specifications stipulate different levels (classes) of design shear resistance for coatings used on contact surfaces of joints in high-strength steel bolted connections. Currently, INDOT specifications do not have a Class requirement listed for the coating. Designers are asking if INDOT has a requirement. Also, there is a conflict within the specifications. Section 619.11 indicates that faying surfaces (contact surfaces) shall be painted. Section 711.65(c) indicates that contact surfaces within friction-type joints shall be free of paint.

PROPOSED SOLUTION: Update 909.02(a) to indicate the class of design shear resistance for the primer on faying surfaces. Also modify a sentence in 711.65(c) to eliminate the conflict with 619.11. These changes will also make the specifications agree with the design manual. Most, but not all of the inorganic zinc primers on the INDOT approved list have been tested for slip coefficient. Of those that have been tested, they meet this class of design shear resistance.

APPLICABLE STANDARD SPECIFICATIONS: 711 & 909

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: 64-8.01

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

Submitted By: Dennis Kuchler (for Jim Reilman)

Title: State Construction Engineer

Organization: INDOT

Phone Number: 317-232-5502

Date: September 8, 2008

APPLICABLE SUB-COMMITTEE ENDORSEMENT? None.

Jim considered discussing this with the Bridge Painting Subcommittee and the 700 Specification Subcommittee but did not since neither of these committees has anyone familiar with shop painting. Jim consulted with Todd Tracy & Kevin Day, both of whom are very knowledgeable in the painting and shop painting fields, before submitting this proposal, and they are in agreement with this revision.

## REVISION TO 2008 STANDARD SPECIFICATIONS

SECTION 711, BEGIN LINE 921, DELETE AND INSERT AS FOLLOWS:

**(c) Bolted Parts**

The slope of surfaces of bolted parts in contact with the bolt head and nut shall not exceed 1:20 with respect to a plane normal to the bolt axis. Bolted parts shall fit together solidly when assembled and shall not be separated by gaskets or any other interposed compressible material. When assembled, all joint surfaces, including those adjacent to the bolt heads, nuts, or washers, shall be free of scale, except tight mill scale, and shall also be free of dirt, loose scale, burrs, other foreign material, and other defects that would prevent solid seating of the parts. Contact surfaces within ~~friction-type slip-critical~~ joints shall be free of oil, ~~paint, lacquer, or rust inhibitor~~ grease, and any other material that reduces friction between the contact surfaces. ~~Paint, in accordance with 619, is not a concern if it exists on the contact surfaces.~~

Other sections containing  
specific cross references:

None

Recurring Special Provisions  
potentially affected:

None

Motion: Mr. Kuchler  
Second: Mr. Keefer  
Ayes: 9  
Nays: 0

General Instructions to Field Employees  
Update Required? No

Frequency Manual  
Update Required? No

Standard Sheets potentially affected:

None

Action: Passed as revised

\_\_\_ RSP Effective: \_\_\_\_\_ Letting  
\_\_\_ RSP Sunset Date: \_\_\_\_\_  
\_\_\_ RPD Effective: \_\_\_\_\_ Letting  
x 2010 Standard Specifications Book  
\_\_\_ 20\_\_ Standards Edition  
\_\_\_ Technical Advisory

Withdrawn \_\_\_\_\_

Received FHWA Approval? Yes

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: n/a

PROPOSED SOLUTION: The Indiana Laborers' Training Trust Fund will begin offering a worksite supervisor training course in the spring of 2009 for its members. INDOT personnel from the Division of Construction Management and Work Zone Safety Section have attended a program presentation of the course and toured the instructional facility located in Bedford on 5/16/08. INDOT officially approved the course as an equivalent to ATSSA on 8/5/08. All individuals taking and passing the course will be considered a CWTS as cited in INDOT's contract Standard Specifications, particularly section 801.03. This proposal is to include this training as a listed approved equal to ATSSA in the specifications.

APPLICABLE STANDARD SPECIFICATIONS: 801.03

APPLICABLE STANDARD DRAWINGS: n/a

APPLICABLE DESIGN MANUAL SECTION: n/a

APPLICABLE SECTION OF GIFE: n/a

APPLICABLE RECURRING SPECIAL PROVISIONS: n/a

Submitted By: Ron Heustis for Joe Novak

Title: Manager, Construction Technical Support

Organization: INDOT

Phone Number: 317-234-2777

Date: 9/5/08

APPLICABLE SUB-COMMITTEE ENDORSEMENT? 801/808 - Yes on 9/5/08

## REVISION TO 2008 STANDARD SPECIFICATIONS

SECTION 801, BEGIN LINE 67, DELETE AND INSERT AS FOLLOWS:

**801.03 General Requirements**

The applicable requirements of the MUTCD shall apply to the installation and materials for traffic control devices subject to the requirements of 107.08 and 107.12. When the plans do not include a maintenance of traffic plan, the Engineer will provide such a plan to the Contractor. The Contractor shall be responsible for the field layout, placement, operation, maintenance, and removal of temporary traffic control devices. A worksite traffic supervisor certified by the ~~American Traffic Safety Service Association, ATSSA~~, *Indiana Laborers' Training Trust Fund* or approved equal certifying organization, shall direct all field layout, placement, operation, maintenance, and removal of temporary traffic control devices. The certified worksite traffic supervisor, CWTS, shall ensure that all traffic control devices, except temporary concrete barrier, meet acceptable standards as outlined in the plans, specifications, and ATSSA's "Quality Standards for Work Zone Traffic Control Devices" prior to installation. The CWTS shall also, prior to installation, ensure that all traffic control devices can be installed in accordance with the plans, specifications, and the MUTCD. All problems shall be reported to the Engineer so a resolution can be worked out prior to installation. The field layout will be reviewed and concurred with by the Engineer prior to placement of any temporary traffic control devices. The CWTS shall be present for the initial setup and all phase changes during the life of the project. The CWTS may designate responsible Contractor personnel to perform day to day operation and maintenance of the temporary traffic control devices. These responsible personnel shall work under the direction of the CWTS and their names shall be given to the Engineer on the project. A copy of the CWTS's certification shall be provided to the Engineer prior to the start of construction or placement of temporary traffic control devices or if the worksite traffic supervisor changes.

*NOTE: A listing of training certifications approved as equals to ATSSA will be provided by the Department and posted to the website in order to avoid potential for continuous revision of this section.*

Other sections containing  
specific cross references:

105.14 Pg 46  
109.05(d) Pg 104  
801.12(b) Pg 618

Recurring Special Provisions  
potentially affected:

None

Motion: M  
Second: M  
Ayes:  
Nays:

General Instructions to Field Employees

Update Required? Y\_\_\_ N\_\_\_

By - Addition or Revision

Frequency Manual

Update Required? Y\_\_\_ N\_\_\_

By - Addition or Revision

Standard Sheets potentially affected:

None

Action: Withdrawn

## REVISION TO 2008 STANDARD SPECIFICATIONS

SECTION 909, AFTER LINE 50, INSERT AS FOLLOWS:

*Inorganic zinc primer for use on faying surfaces at all slip-critical structural bolted connections using ASTM A 325 or ASTM A 490 high-strength bolts in primary members shall meet class B slip coefficient in accordance with Test Method to Determine the Slip Coefficient for Coatings Used in Bolted Joints as adopted by the Research Council on Structural Connections.*

SECTION 909, AFTER LINE 87, INSERT AS FOLLOWS:

*Organic zinc primer for use on faying surfaces at all slip-critical structural bolted connections using ASTM A 325 or ASTM A 490 high-strength bolts in primary members shall meet class B slip coefficient in accordance with Test Method to Determine the Slip Coefficient for Coatings Used in Bolted Joints as adopted by the Research Council on Structural Connections.*

Other sections containing  
specific cross references:

619.02 Pg 390

724.02 Pg 594

Recurring Special Provisions  
potentially affected:

None

Motion: Mr. Kuchler

Second: Mr. Keefer

Ayes: 9

Nays: 0

General Instructions to Field Employees  
Update Required? No

Frequency Manual  
Update Required? No

Standard Sheets potentially affected:

None

Action: Passed as revised

\_\_\_ RSP Effective: \_\_\_\_\_ Letting

\_\_\_ RSP Sunset Date: \_\_\_\_\_

\_\_\_ RPD Effective: \_\_\_\_\_ Letting

x  2010 Standard Specifications Book

\_\_\_ 20\_\_ Standards Edition

\_\_\_ Technical Advisory

Received FHWA Approval? Yes